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1. (Amended) A method of operating a fuel cell having a PEM as the electrolyte, an anode method of on one side of the PEM, a cathode on the other side of the PEM, an external electric circuit connecting the anode and cathode, and a primary electricity using device within the external circuit, comprising the steps of

A. providing a hydrogen containing fuel to the anode and an oxygen containing oxidant to the cathode to generate, for a first period of time, an electric current within the external circuit for operating the primary electricity using device, the cell operating conditions being selected such that, during the course of said first period of time, the cathode potential is maintained above 0.66 volt and cell performance decreases;

B. regenerating the cell after Step A by a) providing a hydrogen containing fuel to the anode while operating said cell using procedures selected to reduce the cathode potential to below 0.50 volt, said procedures including the steps of i) stopping the flow of oxidant to the cell, ii) disconnecting the primary electricity using device and replacing it with a battery in the external circuit, and iii) providing a flow of hydrogen containing gas to the cathode, and b) maintaining the cathode potential below the said 0.50 volt for a second period of time sufficient to essentially **restore** the cell performance decrease which occurred during the course of Step A; and,

C. sequentially repeating Steps A and B to reduce the decrease in cell performance over time.

2. (Original) The method according to claim 1, wherein in Step B the cathode potential is maintained at 0.1 volt or less for said second period of time.

3. (Cancelled)

4. (Cancelled)

5. (Cancelled)

6. (Cancelled)

7. (Cancelled)

8. (Original) A method of operating a fuel cell having a PEM as the electrolyte, an anode on one side of the PEM, a cathode on the other side of the PEM, an

external electric circuit connecting the anode and cathode, and a primary electricity using device within the external circuit, comprising the steps of

A. providing a hydrogen containing fuel to the anode and an oxygen containing oxidant to the cathode to generate, for a first period of time, an electric current within the external circuit for operating the primary electricity using device, the cell operating conditions being selected such that, during the course of said first period of time, the cathode potential is maintained above 0.66 volt and cell performance decreases;

B. regenerating the cell after Step A by a) providing a hydrogen containing fuel to the anode while operating said cell using procedures selected to reduce the cathode potential to below 0.50 volt, said procedures including the steps of i) stopping the flow of oxidant to the cell and replacing it with a flow of inert gas, and ii) disconnecting the electricity using device from the circuit and leaving the circuit open until the cathode potential falls to below 0.5 volt, and b) maintaining the cathode potential below the said 0.50 volt for a second period of time sufficient to essentially restore the cell performance decrease which occurred during the course of Step A; and,

C. sequentially repeating Steps A and B to reduce the decrease in cell performance over time.

9. (Original) The method according to claim 8, wherein in Step B the cathode potential is maintained at 0.1 volt or less for said second period of time.

10. (New) A method of operating a fuel cell having a PEM as the electrolyte, an anode on one side of the PEM, a cathode on the other side of the PEM, an external electric circuit connecting the anode and cathode, and a primary electricity using device within the external circuit, comprising the steps of

A. providing a hydrogen containing fuel to the anode and an oxygen containing oxidant to the cathode to generate, for a first period of time, an electric current within the external circuit for operating the primary electricity using device, the cell operating conditions being selected such that, during the course of said first period of time, the cathode potential is maintained above 0.66 volt and cell performance decreases;

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B. regenerating the cell after Step A by a) providing a hydrogen containing fuel to the anode while operating said cell using procedures selected to reduce the cathode potential to below 0.50 volt, said procedures including the steps of i) disconnecting the primary electricity using device from the external circuit and connecting an auxiliary resistive load in its place, and ii) stopping the flow of oxidant to the cell and allowing the oxidant remaining within the cell to be consumed at the cathode creating a current flow through the auxiliary resistive load within the external circuit; and, b) maintaining the cathode potential below the said 0.50 volt for a second period of time sufficient to essentially restore the cell performance decrease which occurred during the course of Step A; and,

C. sequentially repeating Steps A and B to reduce the decrease in cell performance over time.

11. (New) The method according to claim 10, wherein in Step B said cell operating procedures are selected to reduce cathode potential to 0.1 volt or less for said second period of time.

12. (New) A method of operating a fuel cell having a PEM as the electrolyte, an anode on one side of the PEM, a cathode on the other side of the PEM, an external electric circuit connecting the anode and cathode, and a primary electricity using device within the external circuit, comprising the steps of

A. providing a hydrogen containing fuel to the anode and an oxygen containing oxidant to the cathode to generate, for a first period of time, an electric current within the external circuit for operating the primary electricity using device, the cell operating conditions being selected such that, during the course of said first period of time, the cathode potential is maintained above 0.66 volt and cell performance decreases;

B. regenerating the cell after Step A while the primary electricity using device within the external circuit remains connected across the anode and cathode and while continuing to provide a hydrogen containing fuel to the anode and an oxygen containing oxidant to the cathode using procedures selected to reduce the cathode potential to below 0.50 volt for a second period of time

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sufficient to essentially restore the cell performance decrease which occurred during the course of Step A, said procedures including increasing the oxidant utilization to at least 70% for said second period of time; and,

C. sequentially repeating Steps A and B to reduce the decrease in cell performance over time.

13. (New) A method of operating a fuel cell having a PEM as the electrolyte, an anode on one side of the PEM, a cathode on the other side of the PEM, an external electric circuit connecting the anode and cathode, and a primary electricity using device within the external circuit, comprising the steps of

A. providing a hydrogen containing fuel to the anode and an oxygen containing oxidant to the cathode to generate, for a first period of time, an electric current within the external circuit for operating the primary electricity using device, the cell operating conditions being selected such that, during the course of said first period of time, the cathode potential is maintained above 0.66 volt and cell performance decreases;

B. regenerating the cell after Step A while the primary electricity using device within the external circuit remains connected across the anode and cathode and while continuing to provide a hydrogen containing fuel to the anode and an oxygen containing oxidant to the cathode using procedures selected to reduce the cathode potential to below 0.50 volt for a second period of time sufficient to essentially restore the cell performance decrease which occurred during the course of Step A, said procedures including increasing the current for said second period of time; and,

C. sequentially repeating Steps A and B to reduce the decrease in cell performance over time.

14. (New) A method of operating a fuel cell having a PEM as the electrolyte, an anode on one side of the PEM, a cathode on the other side of the PEM, an external electric circuit connecting the anode and cathode, and a primary electricity using device within the external circuit, comprising the steps of

A. providing a hydrogen containing fuel to the anode and an oxygen containing oxidant to the cathode to generate, for a first period of time, an electric

current within the external circuit for operating the primary electricity using device, the cell operating conditions being selected such that, during the course of said first period of time, the cathode potential is maintained above 0.66 volt and cell performance decreases;

B. regenerating the cell after Step A by

a) providing a hydrogen containing fuel to the anode while operating said cell using procedures selected to reduce the cathode potential to below 0.50 volt, said procedures including the steps of i) stopping the flow of oxidant to the cell and replacing it with a flow of inert gas, and ii)disconnecting the primary electricity using device from the circuit and connecting an auxiliary resistive load in its place; and,

b) maintaining the cathode potential below the said 0.50 volt for a second period of time sufficient to essentially restore the cell performance decrease which occurred during the course of Step A; and,

C. sequentially repeating Steps A and B to reduce the decrease in cell performance over time.

15. (New) A method of operating a fuel cell having a PEM as the electrolyte, an anode on one side of the PEM, a cathode on the other side of the PEM, an external electric circuit connecting the anode and cathode, and a primary electricity using device within the external circuit, comprising the steps of

A. providing a hydrogen containing fuel to the anode and an oxygen containing oxidant to the cathode to generate, for a first period of time, an electric current within the external circuit for operating the primary electricity using device, the cell operating conditions being selected such that, during the course of said first period of time, the cathode potential is maintained above 0.66 volt and cell performance decreases;

B. regenerating the cell after Step A by

a) providing a hydrogen containing fuel to the anode while operating said cell using procedures selected to reduce the cathode potential to below 0.50 volt, said procedures including the steps of i) stopping the flow of oxidant to the cathode and replacing it with a flow of hydrogen, ii) disconnecting

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the primary electricity using device from the circuit and leaving the circuit open until the cathode potential falls to below 0.50 volt; and, b) maintaining the cathode potential below the said 0.50 volt for a second period of time sufficient to essentially restore the cell performance decrease which occurred during the course of Step A; and,

C. sequentially repeating Steps A and B to reduce the decrease in cell performance over time.

16. (New) A method of operating a fuel cell having a PEM as the electrolyte, an anode on one side of the PEM, a cathode on the other side of the PEM, an external electric circuit connecting the anode and cathode, and a primary electricity using device within the external circuit, comprising the steps of

A. providing a hydrogen containing fuel to the anode and an oxygen containing oxidant to the cathode to generate, for a first period of time, an electric current within the external circuit for operating the primary electricity using device, the cell operating conditions being selected such that, during the course of said first period of time, the cathode potential is maintained above 0.66 volt and cell performance decreases;

B. regenerating the cell after Step A by

a) providing a hydrogen containing fuel to the anode while operating said cell using procedures selected to reduce the cathode potential to below 0.50 volt, said procedures including the steps of i) stopping the flow of oxidant to the cell, and ii) disconnecting the primary electricity using device and replacing it with a power supply in the external circuit, and

b) maintaining the cathode potential below the said 0.50 volt for a second period of time sufficient to essentially restore the cell performance decrease which occurred during the course of Step A; and,

C. sequentially repeating Steps A and B to reduce the decrease in cell performance over time.

17. (New) The method according to claim 16, including, in Step B, in addition to steps i) and ii), step iii) providing a flow of hydrogen containing gas to the cathode.

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18. (New) A method of operating a fuel cell having a PEM as the electrolyte, an anode on one side of the PEM, a cathode on the other side of the PEM, an external electric circuit connecting the anode and cathode, and a primary electricity using device within the external circuit, comprising the steps of

A. providing a hydrogen containing fuel to the anode and an oxygen containing oxidant to the cathode to generate, for a first period of time, an electric current within the external circuit for operating the primary electricity using device, the cell operating conditions being selected such that, during the course of said first period of time, the cathode potential is maintained above 0.66 volt and cell performance decreases;

B. regenerating the cell after Step A by a) providing a hydrogen containing fuel to the anode while operating said cell using procedures selected to reduce the cathode potential to below 0.50 volt, said procedures including the steps of i) stopping the flow of oxidant to the cell and replacing it with a flow of gas selected from the group consisting of carbon dioxide, methane, natural gas, propane, and butane, and ii) disconnecting the primary electricity using device from the circuit and leaving the circuit open until the cathode potential falls to below 0.5 volt; and, b) maintaining the cathode potential below the said 0.50 volt for a second period of time sufficient to essentially restore the cell performance decrease which occurred during the course of Step A; and,

C. sequentially repeating Steps A and B to reduce the decrease in cell performance over time.

19. (New) A method of operating a fuel cell having a PEM as the electrolyte, an anode on one side of the PEM, a cathode on the other side of the PEM, an external electric circuit connecting the anode and cathode, and a primary electricity using device within the external circuit, comprising the steps of

A. providing a hydrogen containing fuel to the anode and an oxygen containing oxidant to the cathode to generate, for a first period of time, an electric current within the external circuit for operating the primary

electricity using device, the cell operating conditions being selected such that, during the course of said first period of time, the cathode potential is maintained above 0.66 volt and cell performance decreases;

B. regenerating the cell after Step A by

a) providing a hydrogen containing fuel to the anode while operating said cell using procedures selected to reduce the cathode potential to below 0.50 volt, said procedures including the steps of i) stopping the flow of oxidant to the cell and replacing it with a flow of gas selected from the group consisting of carbon dioxide, methane, natural gas, propane, and butane, and ii)disconnecting the primary electricity using device from the circuit and connecting an auxiliary resistive load in its place; and,

b) maintaining the cathode potential below the said 0.50 volt for a second period of time sufficient to essentially restore the cell performance decrease which occurred during the course of Step A; and,

C. sequentially repeating Steps A and B to reduce the decrease in cell performance over time.

20. (New) A method of operating a fuel cell having a PEM as the electrolyte, an anode on one side of the PEM, a cathode on the other side of the PEM, an external electric circuit connecting the anode and cathode, and a primary electricity using device within the external circuit, comprising the steps of

A. providing a hydrogen containing fuel to the anode and an oxygen containing oxidant to the cathode to generate, for a first period of time, an electric current within the external circuit for operating the primary electricity using device, the cell operating conditions being selected such that, during the course of said first period of time, the cathode potential is maintained above 0.66 volt and cell performance decreases;

B. regenerating the cell after Step A by a) providing a hydrogen containing fuel to the anode while operating said cell using procedures selected to reduce the cathode potential to below 0.50 volt, said procedures including the steps of i) stopping the flow of oxidant to the cell and replacing it with a flow of inert gas, and ii) disconnecting the primary electricity using

device from the circuit and leaving the circuit open until the cathode potential falls to below 0.5 volt, and b) maintaining the cathode potential below the said 0.50 volt for a second period of time sufficient to restore at least a major portion of the cell performance decrease which occurred during the course of Step A; and,

C. sequentially repeating Steps A and B to reduce the decrease in cell performance over time.

21. (New) A method of operating a fuel cell having a PEM as the electrolyte, an anode on one side of the PEM, a cathode on the other side of the PEM, an external electric circuit connecting the anode and cathode, and a primary electricity using device within the external circuit, comprising the steps of

A. providing a hydrogen containing fuel to the anode and an oxygen containing oxidant to the cathode to generate, for a first period of time, an electric current within the external circuit for operating the primary electricity using device, the cell operating conditions being selected such that, during the course of said first period of time, the cathode potential is maintained above 0.66 volt and cell performance decreases;

B. regenerating the cell after Step A by a) providing a hydrogen containing fuel to the anode while operating said cell using procedures selected to reduce the cathode potential to below 0.50 volt, said procedures including the steps of i) disconnecting the primary electricity using device from the external circuit, and ii) with an auxiliary resistive load connected across the cell, stopping the flow of oxidant to the cell and allowing the oxidant remaining within the cell to be consumed at the cathode creating a current flow through the auxiliary resistive load; and, b) maintaining the cathode potential below the said 0.50 volt for a second period of time sufficient to essentially restore the cell performance decrease which occurred during the course of Step A; and,

C. sequentially repeating Steps A and B to reduce the decrease in cell performance over time.